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To: Commissioner for Patents for **Examiner Kristie D. Shingles** **Group Art Unit 2141**	Facsimile No.: **571/273-8300**
From: Carrie Parker Legal Assistant to Lisa Yociss	No. of Pages Including Cover Sheet: **14**

Message:

Enclosed herewith:

- Transmittal of Reply Brief; and
- Reply Brief.

Re: Application No. **09/886,186**
    Attorney Docket No: **AUS920010472US1**

DATE: Friday May 5, 2006

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Craddock et al. §   Group Art Unit: 2141

Serial No.: 09/886,186   §   Examiner: Shingles, Kristie D.

Filed: June 21, 2001   §   Attorney Docket No.: AUS920010472US1

For: Apparatus and Method for
Routing Internet Protocol Frames
Over a System Area Network

35525
PATENT TRADEMARK OFFICE
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By: *Carrie Parker*
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TRANSMITTAL OF REPLY BRIEF

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Sir:
ENCLOSED HEREWITH:

- Reply Brief (37 C.F.R. 41.41).

No fees are believed to be required. If, however, any fees are required, I authorize the Commissioner to charge these fees which may be required to IBM Corporation Deposit Account No. 09-0447.

Respectfully submitted,

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Docket No. AUS920010472US1   *PATENT*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Craddock et al.**	§	
	§	Group Art Unit: **2141**
Serial No.: **09/886,186**	§	
	§	Examiner: **Shingles, Kristie D.**
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Commissioner for Patents
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REPLY BRIEF (37 C.F.R. 41.41)

This Reply Brief is submitted in response to the Examiner's Answer mailed on March 7, 2006.

No fees are believed to be required to file a Reply Brief. If any fees are required for filing this Reply Brief, those fees are dealt with in the accompanying TRANSMITTAL OF REPLY BRIEF.

RESPONSE TO EXAMINER'S ANSWER

This Reply Brief is filed to address the issues raised by the Examiner in his Answer mailed March 7, 2006.

The Examiner states in his Answer on page 9 that *Acharya* teaches passing data from the host channel adapter directly to an IP router that uses IP as its networking protocol, where the router is connected directly to the host channel adapter because *Acharya* teaches the controller and DS_SL mapping table of the router being able to pass data directly to the host channel adapter (HCA) that is included within the router. The Examiner admits that the router includes the HCA and further states that the HCA and the router function together as a combination.

The Examiner separates the router into two portions and describes the controller and the DS_SL mapping table as being a routing portion and the host channel adapter as being the HCA portion. The DS_SL mapping table, which is included within the router, is coupled to the HCA, which is also included within the router. Thus, the Examiner is essentially arguing that *Acharya* teaches passing data from a router to that same router.
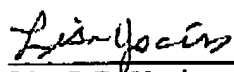
Applicants claim passing data from a router to a host channel adapter. As is clear from Applicants' claim language, the router and the host channel adapter are separate devices. The router and the HCA of *Acharya* are not separate devices. One is included within the other, i.e. the HCA is included within the router.

The Examiner argues that *Acharya* teaches passing data from a routing portion of a router to an HCA portion of that router. Applicants' claims do not describe passing data between portions of a router. Applicants' claims describe passing data from a router to a host channel adapter. *Acharya* teaches passing data around within a router, where the router includes a host channel adapter. *Acharya* does not teach passing data from a host channel adapter to a router.

Applicants' claims also describe the router being connected directly to the host channel adapter. The Examiner states in his Answer on page 10 that *Acharya* teaches a router that is connected directly to the host channel adapter because the router of *Acharya* includes the HCA within the router. As is clear from Applicants' claim language, Applicants claim a router being connected directly to the host channel adapter. Applicants do not claim a router that includes the host channel adapter. *Acharya* does not teach a router that is connected directly to the host channel adapter.

Applicants' claims are not rendered obvious for the reasons given in the Appeal Brief and for the reasons given above.

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APPENDIX OF CLAIMS

The text of the claims involved in the appeal reads:

1.   A method of transmitting data packets from a system area network device to an external network device, comprising:

passing data generated by a host process to a host channel adapter that utilizes an InfiniBand (IB) protocol as its networking protocol for data communications; and

passing the data from the host channel adapter directly to an Internet Protocol (IP) router that uses IP as its networking protocol for data communications, the router being connected directly to the host channel adapter, the router also being coupled to an external network that utilizes IP as its networking protocol for data communications.

2.   The method of claim 1, wherein passing the data generated by a host process to a host channel adapter included in a host includes invoking an Internet Protocol (IP) over InfiniBand (IB) device driver in the host.

3.   The method of claim 2, wherein passing data generated by a host process to a host channel adapter includes creating an IP over IB Queue Pair in the host channel adapter for use with the IP over IB device driver.

4.   The method of claim 2, wherein the step of passing data generated by a host process to a host channel adapter is performed in response to an I/O Transmit transaction being received by the IP over IB device driver.

5.   The method of claim 4, wherein the I/O Transmit transaction originates from one of a user level program and a kernel level program.

6.   The method of claim 4, wherein the I/O Transmit transaction includes one or more pointers to one or more memory regions which contain the data, and wherein the I/O Transmit transaction further includes one of a destination address and destination address handle.

7.   The method of claim 1, wherein passing data generated by a host process to a host channel adapter includes using a Post Send verb to instruct the host channel adapter to send data from system memory to a designated destination.

8.   The method of claim 1, wherein the data is passed to the host channel adapter as one of a Raw Datagram and a Unreliable Datagram.

9.   An apparatus for transmitting data packets from a system area network device to an external network device, comprising:

means for passing data generated by a host process to a host channel adapter that utilizes an InfiniBand (IB) protocol as its networking protocol for data communications; and

means for passing the data from the host channel adapter directly to an Internet Protocol (IP) router that uses IP as its networking protocol for data communications, the router being connected directly to the host channel adapter, the router also being coupled to an external network that utilizes IP as its networking protocol for data communications.

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10.   The apparatus of claim 9, wherein the means for passing the data generated by a host process to a host channel adapter in a host includes means for invoking an Internet Protocol (IP) over InfiniBand (IB) device driver in the host.

11.   The apparatus of claim 10, wherein the means for passing data generated by a host process to a host channel adapter includes means for creating an IP over IB Queue Pair in the host channel adapter for use with the IP over IB device driver.

12.   The apparatus of claim 10, wherein the means for passing data generated by a host process to a host channel adapter operates in response to an I/O Transmit transaction being received by the IP over IB device driver.

13.   The apparatus of claim 12, wherein the I/O Transmit transaction originates from one of a user level program and a kernel level program.

14.   The apparatus of claim 12, wherein the I/O Transmit transaction includes one or more pointers to one or more memory regions which contain the data, and wherein the I/O Transmit transaction further includes one of a destination address and destination address handle.

15.   The apparatus of claim 9, wherein the means for passing data generated by a host process to a host channel adapter includes means for using a Post Send verb to instruct the host channel adapter to send data from system memory to a designated destination.

16.   The apparatus of claim 9, wherein the data is passed to the host channel adapter as one of

a Raw Datagram and a Unreliable Datagram.

17.   A computer program product in a computer readable medium for transmitting data

packets from a system area network device to an external network device, comprising:

    first instructions for passing data generated by a host process to a host channel adapter

that utilizes an InfiniBand (IB) protocol as its networking protocol for data communications; and

    second instructions for passing the data from the host channel adapter directly to an

Internet Protocol (IP) router that uses IP as its networking protocol for data communications, the

router being connected directly to the host channel adapter, the router also being coupled to an

external network that utilizes IP as its networking protocol for data communications.

18.   The computer program product of claim 17, wherein the first instructions for passing the

data generated by a host process in a host to a host channel adapter include instructions for

invoking an Internet Protocol (IP) over InfiniBand (IB) device driver in the host.

19.   The computer program product of claim 18, wherein the first instructions for passing data

generated by a host process to a host channel adapter include instructions for creating an IP over

IB Queue Pair in the host channel adapter for use with the IP over IB device driver.

20.   The computer program product of claim 18, wherein the first instructions for passing data

generated by a host process to a host channel adapter are executed in response to an I/O Transmit

transaction being received by the IP over IB device driver.

21.   The computer program product of claim 20, wherein the I/O Transmit transaction originates from one of a user level program and a kernel level program.

22.   The computer program product of claim 20, wherein the I/O Transmit transaction includes one or more pointers to one or more memory regions which contain the data, and wherein the I/O Transmit transaction further includes one of a destination address and destination address handle.

23.   The computer program product of claim 17, wherein the first instructions for passing data generated by a host process to a host channel adapter include instructions for using a Post Send verb to instruct the host channel adapter to send data from system memory to a designated destination.

24.   The computer program product of claim 17, wherein the data is passed to the host channel adapter as one of a Raw Datagram and a Unreliable Datagram.

25.   A method of routing data between a system area network and an external network, comprising:

receiving, within an Internet Protocol (IP) router, data from a host channel adapter that utilizes an InfiniBand (IB) protocol as its network protocol for data communications, the IP router utilizing IP as its networking protocol for data communications, the IP router being connected directly to the host channel adapter;

parsing a routing header of the data;

identifying an output port of the router based on the parsing of the routing header; and

sending the data out of the router via the identified output port.

26.   The method of claim 25, wherein identifying an output port of the router includes

examining one of an InfiniBand Global Router Header's Destination Global Identifier and an

IPv6 Destination Address.

27.   The method of claim 25, wherein if the data is an Unreliable Datagram and the identified

output port is not an InfiniBand output port, only an InfiniBand Transport Header associated with

the data is discarded.

28.   The method of claim 25, wherein sending the data out of the router includes creating an

InfiniBand link layer header for the data.

29.   The method of claim 28, wherein the InfiniBand link layer header identifies a host

channel adapter receive queue.

30.   The method of claim 28, wherein the InfiniBand link layer header identifies an external

network.

31.   A computer program product in a computer readable medium for routing data between a

system area network and an external network, comprising:

first instructions for receiving data within an Internet Protocol (IP) router from a host

channel adapter that utilizes an InfiniBand (IB) protocol as its network protocol for data

communications, the IP router utilizing IP as its networking protocol for data communications,

the IP router being connected directly to the host channel adapter;

    second instructions for parsing a routing header of the data;

    third instructions for identifying an output port of the router based on the parsing of the

routing header; and

    fourth instructions for sending the data out of the router via the identified output port.

32.   The computer program product of claim 31, wherein the third instructions for identifying

an output port of the router include instructions for examining one of an InfiniBand Global

Router Header's Destination Global Identifier and an IPv6 Destination Address.

33.   The computer program product of claim 31, wherein if the data is an Unreliable Datagram

and the identified output port is not an InfiniBand output port, only an InfiniBand Transport

Header associated with the data is discarded.

34.   The computer program product of claim 31, wherein the fourth instructions for sending

the data out of the router include instructions for creating an InfiniBand link layer header for the

data.

35.   The method of claim 34, wherein the InfiniBand link layer header identifies a host

channel adapter receive queue.

36.   The method of claim 34, wherein the InfiniBand link layer header identifies an external network.

37.   An apparatus for routing data between a system area network and an external network, comprising:

means for receiving, within an Internet Protocol (IP) router, data from a host channel adapter that utilizes an InfiniBand (IB) protocol as its network protocol for data communications, the IP router utilizing IP as its networking protocol for data communications, the IP router being connected directly to the host channel adapter;

means for parsing a routing header of the data;

means for identifying an output port of the router based on the parsing of the routing header; and

means for sending the data out of the router via the identified output port.

38.   The apparatus of claim 37, wherein the means for identifying an output port of the router includes means for examining one of an InfiniBand Global Router Header's Destination Global Identifier and an IPv6 Destination Address.

39.   The apparatus of claim 37, wherein if the data is an Unreliable Datagram and the identified output port is not an InfiniBand output port, only an InfiniBand Transport Header associated with the data is discarded.

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40.   The apparatus of claim 37, wherein the means for sending the data out of the router includes creating an InfiniBand link layer header for the data.

41.   The apparatus of claim 40, wherein the InfiniBand link layer header identifies a host channel adapter receive queue.

42.   The apparatus of claim 40, wherein the InfiniBand link layer header identifies an external network.